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Jc952 U.S. PTO

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Jc913 U.S. PTO
09/693415

10/20/00

**UTILITY
PATENT APPLICATION
TRANSMITTAL**

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.

NPA011US

First Inventor

KIA SILVERBROOK

Title

METHOD AND SYSTEM FOR ADVERTISING

Express Mail Label No.

EK333430814US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO:

Assistant Commissioner for Patents
Box Patent Application
Washington, DC 20231

1. ☒ Fee Transmittal Form (e.g., PTO/SB/17)
(Submit an original and a duplicate for fee processing)
2. ☒ Applicant claims small entity status.
See 37 CFR 1.27.
3. ☒ Specification [Total Pages **27**]
(preferred arrangement set forth below)
- Descriptive title of the invention
 - Cross Reference to Related Applications
 - Statement Regarding Fed sponsored R & D
 - Reference to sequence listing, a table, or a computer program listing appendix
 - Background of the Invention
 - Brief Summary of the Invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
4. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets **8**]
5. Oath or Declaration [Total Pages **3**]
- a. ☒ Newly executed (original or copy)
Copy from a prior application (37 CFR 1.63 (d))
- b. ☐ (for continuation/divisional with Box 17 completed)
- i. ☐ **DELETION OF INVENTOR(S)**
Signed statement attached deleting inventor(s)
named in the prior application, see 37 CFR
1.63(d)(2) and 1.33(b)
6. ☐ Application Data Sheet. See 37 CFR 1.76

7. ☐ CD-ROM or CD-R in duplicate, large table or
Computer Program (Appendix)
8. Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)
- a. ☐ Computer Readable Form (CRF)
- b. Specification Sequence Listing on:
- i. ☐ CD-ROM or CD-R (2 copies); or
- ii. ☐ paper
- c. ☐ Statements verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

9. ☒ Assignment Papers (cover sheet & document(s))
10. ☐ 37 CFR 3.73(b) Statement (when there is an assignee) ☐ Power of Attorney
11. ☐ English Translation Document (if applicable)
12. ☐ Information Disclosure Statement (IDS)/PTO-1449 ☐ Copies of IDS Citations
13. ☐ Preliminary Amendment
14. ☐ Return Receipt Postcard (MPEP 503)
(Should be specifically itemized)
15. ☒ Certified Copy of Priority Document(s)
(if foreign priority is claimed)
16. ☐ Other:

17. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment, or in an Application Data Sheet under 37 CFR 1.76:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP)

of prior application No. _____ / _____

Prior application information.

Examiner _____

Group / Art Unit _____

For CONTINUATION OR DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.**18. CORRESPONDENCE ADDRESS**☒ Customer Number or Bar Code Label**24011**
(Insert Customer No. or Attach bar code label here)or ☐ Correspondence address below

Name	KIA SILVERBROOK				
Address	393 Darling Street,				
City	Balmain	State	NSW	Zip Code	2041
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Name (Print/Type)

KIA SILVERBROOK

Registration No. (Attorney/Agent)

Signature

*KIA*Date **October 18, 2000**

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PTO/SB/17 (09-00)

PTO
09/693415
10/20/00

FEE TRANSMITTAL for FY 2001

Patent fees are subject to annual revision.

Complete if Known

Application Number
Filing Date
First Named Inventor *Kia Silverbrook*
Examiner Name
Group Art Unit
Attorney Docket No. *NPA011US*

TOTAL AMOUNT OF PAYMENT (\$) 435

METHOD OF PAYMENT

1. ☐ The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to:

Deposit Account Number
Deposit Account Name

☐ Charge Any Additional Fee Required Under 37 CFR 1.16 and 1.17

☐ Applicant claims small entity status See 37 CFR 1.27

2. ☒ Payment Enclosed:

☒ Check ☐ Credit card ☐ Money Order ☐ Other

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
101 710	201 355	Utility filing fee	355
106 320	206 160	Design filing fee	
107 490	207 245	Plant filing fee	
108 710	208 355	Reissue filing fee	
114 150	214 75	Provisional filing fee	

SUBTOTAL (1) (\$) 355

2. EXTRA CLAIM FEES

Total Claims	Extra Claims	Fee from below	Fee Paid
15	-20** = 0	9	0
2	-3** = 0	40	0
Multiple Dependent			

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description
103 18	203 9	Claims in excess of 20
102 80	202 40	Independent claims in excess of 3
104 270	204 135	Multiple dependent claim, if not paid
109 80	209 40	** Reissue independent claims over original patent
110 18	210 9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) (\$) 0

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
105 130	205 65	Surcharge - late filing fee or oath	
127 50	227 25	Surcharge - late provisional filing fee or cover sheet	
139 130	139 130	Non-English specification	
147 2,520	147 2,520	For filing a request for <i>ex parte</i> reexamination	
112 920*	112 920*	Requesting publication of SIR prior to Examiner action	
113 1,840*	113 1,840*	Requesting publication of SIR after Examiner action	
115 110	215 55	Extension for reply within first month	
116 390	216 195	Extension for reply within second month	
117 890	217 445	Extension for reply within third month	
118 1,390	218 695	Extension for reply within fourth month	
128 1,890	228 945	Extension for reply within fifth month	
119 310	219 155	Notice of Appeal	
120 310	220 155	Filing a brief in support of an appeal	
121 270	221 135	Request for oral hearing	
138 1,510	138 1,510	Petition to institute a public use proceeding	
140 110	240 55	Petition to revive - unavoidable	
141 1,240	241 620	Petition to revive - unintentional	
142 1,240	242 620	Utility issue fee (or reissue)	
143 440	243 220	Design issue fee	
144 600	244 300	Plant issue fee	
122 130	122 130	Petitions to the Commissioner	
123 50	123 50	Petitions related to provisional applications	
126 240	126 240	Submission of Information Disclosure Stmt	
581 40	581 40	Recording each patent assignment per property (times number of properties)	80
146 710	246 355	Filing a submission after final rejection (37 CFR § 1.129(a))	
149 710	249 355	For each additional invention to be examined (37 CFR § 1.129(b))	
179 710	279 355	Request for Continued Examination (RCE)	
169 900	169 900	Request for expedited examination of a design application	

Other fee (specify) _____

* Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$) 80

SUBMITTED BY

Name (Print/Type)	<i>Kia Silverbrook</i>	Registration No (Attorney/Agent)	Telephone	+61-2-9818-6633
Signature	<i>[Signature]</i>		Date	October 18, 2000

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METHOD AND SYSTEM FOR ADVERTISING

FIELD OF INVENTION

The present invention relates generally to electronically delivered printed documents and, more particularly, to a method and system for the automatic placement
5 of advertising in otherwise empty space in such printed documents.

CO-PENDING APPLICATIONS

Various methods, systems and apparatus relating to the present invention are disclosed in the following co-pending applications filed by the applicant or assignee of the present invention simultaneously with the present invention:

- 10 NPA011US, NPA031US, NPA040US, NPA046US, NPA053US, NPA059US,
NPA064US, NPB006US, NPS004US, NPS008US, NPS013US, NPS024US,
NPPC1, UP01US, UP02US, UP03US, UP04US, UP05US

The disclosures of these co-pending applications are incorporated herein by cross-
15 reference. Each application is temporarily identified by its docket number. This will be replaced by the corresponding USSN when available.

Various methods, systems and apparatus relating to the present invention are disclosed in the following co-pending applications filed by the applicant or assignee of the present invention on 15 September 2000:

- 20 NPA024US, NPA025US, NPA047US, NPA049US

The disclosures of these co-pending applications are incorporated herein by cross-reference. Each application is temporarily identified by its docket number. This will be replaced by the corresponding USSN when available.

25 Various methods, systems and apparatus relating to the present invention are disclosed in the following co-pending applications filed by the applicant or assignee of the present invention on 30 June 2000:

- 30 NPA014US, NPA015US, NPA022US, NPA026US, NPA038US, NPA041US,
NPA050US, NPA051US, NPA052US, NPA063US, NPA065US, NPA067US,
NPA068US, NPA069US, NPA071US, NPA072US, NPB003US, NPB004US,
NPB005US, NPP019US, PEC04US, PEC05US, PEC06US, PEC07US

The disclosures of these co-pending applications are incorporated herein by cross-reference. Each application is temporarily identified by its docket number. This will be replaced by the corresponding USSN when available.

Various methods, systems and apparatus relating to the present invention are
5 disclosed in the following co-pending applications filed by the applicant or assignee of the present invention on 23 May 2000:

10 NPA001US, NPA002US, NPA004US, NPA005US, NPA006US, NPA007US,
NPA008US, NPA009US, NPA010US, NPA012US, NPA016US, NPA017US,
NPA018US, NPA019US, NPA020US, NPA021US, NPA030US, NPA035US,
15 NPA048US, NPA075US, NPB001US, NPB002US, NPK002US, NPK003US,
NPK004US, NPK005US, NPM001US, NPM002US, NPM003US, NPM004US,
NPN001US, NPP001US, NPP003US, NPP005US, NPP006US, NPP007US,
NPP008US, NPP016US, NPP017US, NPP018US, NPS001US, NPS003US,
NPS020US, NPT001US, NPT002US, NPT003US, NPT004US, NPX001US,
20 NPX003US, NPX008US, NPX011US, NPX014US, NPX016US, IJ52US,
IJM52US, MJ10US, MJ11US, MJ12US, MJ13US, MJ14US,
MJ15US, MJ34US, MJ47US, MJ58US, MJ62US, MJ63US,
PAK04US, PAK05US, PAK06US, PAK07US, PAK08US, PEC01US,
PEC02US, PEC03US

20 The disclosures of these co-pending applications are incorporated herein by cross-reference. Each application is temporarily identified by its docket number. This will be replaced by the corresponding USSN when available.

BACKGROUND

Advertising has traditionally been distributed in printed publications, and typically placed to exploit the editorial context, the locality of the publication's distribution, and the demographic of its readership.

- 5 In more recent times advertising has been distributed as part of Web pages. The Web page advertising space is typically specifically allocated for, and dedicated to, advertising. Advertisements typically are often customised and targeted based on the page being viewed or the search being carried out by the user. If the user is registered with the site the advertising may be targeted to the user's demographic based on the
- 10 user's known profile.

SUMMARY OF INVENTION

It is an objective of the present invention to provide a new method and system for advertising.

- 15 In a first aspect, the present invention provides a method of producing a document by formatting user requested information in the document so as to include one user interactive element, to allow the user to effect a response to the information, using a sensing device for transmitting response data back to a computer system, including:

identifying an advertising space, outside an area of the document to be occupied by the information; and

- 20 printing the document with advertising material in the space.

Preferably, the advertising space is determined to be on a reverse side of the document relative to the user requested information.

- Preferably also, the information is formatted at a publication server of the computer system and the method includes the publication server monitoring the said area
- 25 and, once the space is identified, receiving the advertising material from an advertising server, for inclusion in the document.

Preferably also, the document is printed with coded data, for sensing by the sensing device, indicative of an identity of the document and of the at least one interactive element. Preferably also, the document is printed on a surface defining

structure at the same time as the coded data is printed on the surfaces. Preferably also, the method includes including retaining a retrievable record of the printed document, the document being retrievable using the identity data as contained in the coded data.

Preferably also, wherein the sensing device includes an identification code
5 specific to a particular user and the method includes monitoring use of the sensing device in the computer system.

In a second aspect, the present invention provides a system for producing a document, including :

a computer system for formatting user requested information in the document
10 so as to include at least one user interactive element, to allow the user to effect a response to the information, using a sensing device for transmitting response data back to the computer system, wherein the computer system is arranged to identify an advertising space, outside an area of the document to be occupied by the information and to effect printing of the document with advertising material in said space.

15 Preferably, the system includes a printer adapted to print on both sides of the document, in order to print the advertising material on a reverse side of the document, relative to the user requested information.

Preferably also, the computer system includes a publication server for formatting the document and an advertising server for providing the advertising material,
20 wherein the publication server monitors said area and receives advertising material from the advertising server, for inclusion in the document.

Preferably also, the document includes coded data indicative of an identity of the document and of the at least one interactive element. Preferably also, the printer is arranged to print the coded data at the same time as printing the document on a surface
25 defining structure. Preferably also, wherein the coded data is substantially invisible in the visible spectrum. Preferably also, the system includes a database for keeping a retrievable record of each document generated, each document being retrievable by using its identity, as included in the coded data.

Accordingly, the present invention provides a method and system which
30 utilizes one or more forms capable of interacting with a computer system. Whilst the

novel method and system of the present invention may be used in conjunction with a single computer system, in a particularly preferred form it is designed to operate over a computer network, such as the Internet.

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BRIEF DESCRIPTION OF DRAWINGS

Preferred and other embodiments of the invention will now be described, by way of non-limiting example only, with reference to the accompanying drawings, in which:

- 5 Figure 1 is a schematic of a the relationship between a sample printed netpage and its online page description;

Figure 2 is a schematic view of a interaction between a netpage pen, a netpage printer, a netpage page server, and a netpage application server;

- 10 Figure 3 is a schematic view of a high-level structure of a printed netpage and its online page description;

Figure 4a is a plan view showing a structure of a netpage tag;

Figure 4b is a plan view showing a relationship between a set of the tags shown in Figure 4a and a field of view of a netpage sensing device in the form of a netpage pen;

Figure 5a is a plan view showing an alternative structure of a netpage tag;

- 15 Figure 5b is a plan view showing a relationship between a set of the tags shown in Figure 5a and a field of view of a netpage sensing device in the form of a netpage pen;

Figure 5c is a plan view showing an arrangement of nine of the tags shown in Figure 5a where targets are shared between adjacent tags;

- 20 Figure 5d is a plan view showing the interleaving and rotation of the symbols of the four codewords of the tag shown in Figure 5a;

Figure 6 is a example of an advertisement placed within free space on a page; and

Figure 7 is an example of an advertisement placed on the reverse-side of a page.

DETAILED DESCRIPTION OF PREFERRED AND OTHER EMBODIMENTS

Note: Memjet™ is a trademark of Silverbrook Research Pty Ltd, Australia.

In the preferred embodiment, the invention is configured to work with the netpage networked computer system, a summary of which is given below and a detailed
5 description of which is given in our earlier applications, including in particular applications USSN 09/_____ (docket no. NPT002US), USSN 09/_____ (docket no. NPS001US), USSN 09/_____ (docket no. NPP003US), USSN 09/_____ (docket no. NPA002US) and USSN 09/_____ (docket no. IJ52US). It will be appreciated that not every implementation will necessarily embody
10 all or even most of the specific details and extensions described in these applications in relation to the basic system. However, the system is described in its most complete form to assist in understanding the context in which the preferred embodiments and aspects of the present invention operate.

In brief summary, the preferred form of the netpage system employs a computer
15 interface in the form of a mapped surface, that is, a physical surface which contains references to a map of the surface maintained in a computer system. The map references can be queried by an appropriate sensing device. Depending upon the specific implementation, the map references may be encoded visibly or invisibly, and defined in such a way that a local query on the mapped surface yields an unambiguous map
20 reference both within the map and among different maps. The computer system can contain information about features on the mapped surface, and such information can be retrieved based on map references supplied by a sensing device used with the mapped surface. The information thus retrieved can take the form of actions which are initiated by the computer system on behalf of the operator in response to the operator's interaction
25 with the surface features.

In its preferred form, the netpage system relies on the production of, and human interaction with, netpages. These are pages of text, graphics and images printed on ordinary paper or other media, but which work like interactive web pages. Information is encoded on each page using ink which is substantially invisible to the unaided human
30 eye. The ink, however, and thereby the coded data, can be sensed by an optically imaging pen and transmitted to the netpage system.

In the preferred form, active buttons and hyperlinks on each page can be clicked with the pen to request information from the network or to signal preferences to a network server. In one embodiment, text written by hand on a netpage is automatically recognized and converted to computer text in the netpage system, allowing forms to be filled in. In other embodiments, signatures recorded on a netpage are automatically verified, allowing e-commerce transactions to be securely authorized.

As illustrated in Figure 1, a printed netpage 1 can represent a interactive form which can be filled in by the user both physically, on the printed page, and "electronically", via communication between the pen and the netpage system. The example shows a "Request" form containing name and address fields and a submit button. The netpage consists of graphic data 2 printed using visible ink, and coded data 3 printed as a collection of tags 4 using invisible ink. The corresponding page description 5, stored on the netpage network, describes the individual elements of the netpage. In particular it describes the type and spatial extent (zone) of each interactive element (i.e. text field or button in the example), to allow the netpage system to correctly interpret input via the netpage. The submit button 6, for example, has a zone 7 which corresponds to the spatial extent of the corresponding graphic 8.

As illustrated in Figure 2, the netpage pen 101, a preferred form of which is described in our earlier application USSN 09/_____ (docket no. NPS001US), works in conjunction with a netpage printer 601, an Internet-connected printing appliance for home, office or mobile use. The pen is wireless and communicates securely with the netpage printer via a short-range radio link 9.

The netpage printer 601, preferred forms of which are described in our earlier application USSN 09/_____ (docket no. NPP003US) and our co-filed application USSN 09/_____ (docket no. NPS024US), is able to deliver, periodically or on demand, personalized newspapers, magazines, catalogs, brochures and other publications, all printed at high quality as interactive netpages. Unlike a personal computer, the netpage printer is an appliance which can be, for example, wall-mounted adjacent to an area where the morning news is first consumed, such as in a user's kitchen, near a breakfast table, or near the household's point of departure for the day. It also comes in tabletop, desktop, portable and miniature versions.

Netpages printed at their point of consumption combine the ease-of-use of paper with the timeliness and interactivity of an interactive medium.

As shown in Figure 2, the netpage pen 101 interacts with the coded data on a printed netpage 1 and communicates, via a short-range radio link 9, the interaction to a netpage printer. The printer 601 sends the interaction to the relevant netpage page server 10 for interpretation. In appropriate circumstances, the page server sends a corresponding message to application computer software running on a netpage application server 13. The application server may in turn send a response which is printed on the originating printer.

10 The netpage system is made considerably more convenient in the preferred embodiment by being used in conjunction with high-speed microelectromechanical system (MEMS) based inkjet (Memjet™) printers, described in our earlier application USSN 09/_____ (docket no. IJ52US). In the preferred form of this technology, relatively high-speed and high-quality printing is made more affordable to consumers. In
15 its preferred form, a netpage publication has the physical characteristics of a traditional newsmagazine, such as a set of letter-size glossy pages printed in full color on both sides, bound together for easy navigation and comfortable handling.

 The netpage printer exploits the growing availability of broadband Internet access. The netpage printer can also operate with slower connections, but with longer
20 delivery times and lower image quality. The netpage system can also be enabled using existing consumer inkjet and laser printers, although the system will operate more slowly and will therefore be less acceptable from a consumer's point of view. In other embodiments, the netpage system is hosted on a private intranet. In still other embodiments, the netpage system is hosted on a single computer or computer-enabled
25 device, such as a printer.

 Netpage publication servers 14 on the netpage network are configured to deliver print-quality publications to netpage printers. Periodical publications are delivered automatically to subscribing netpage printers via pointcasting and multicasting Internet protocols. Personalized publications are filtered and formatted according to
30 individual user profiles.

 A netpage printer can be configured to support any number of pens, and a pen

can work with any number of netpage printers. In the preferred implementation, each netpage pen has a unique identifier. A household may have a collection of colored netpage pens, one assigned to each member of the family. This allows each user to maintain a distinct profile with respect to a netpage publication server or application server.

5 A netpage pen can also be registered with a netpage registration server 11 and linked to one or more payment card accounts. This allows e-commerce payments to be securely authorized using the netpage pen. The netpage registration server compares the signature captured by the netpage pen with a previously registered signature, allowing it
10 to authenticate the user's identity to an e-commerce server. Other biometrics can also be used to verify identity. A version of the netpage pen includes fingerprint scanning, verified in a similar way by the netpage registration server.

Although a netpage printer may deliver periodicals such as the morning newspaper without user intervention, it can be configured never to deliver unsolicited
15 junk mail. In its preferred form, it only delivers periodicals from subscribed or otherwise authorized sources. In this respect, the netpage printer is unlike a fax machine or e-mail account which is visible to any junk mailer who knows the telephone number or e-mail address.

Each object model in the system is described using a Unified Modeling
20 Language (UML) class diagram. A class diagram consists of a set of object classes connected by relationships, and two kinds of relationships are of interest here: associations and generalizations. An association represents some kind of relationship between objects, i.e. between instances of classes. A generalization relates actual classes, and can be understood in the following way: if a class is thought of as the set of all
25 objects of that class, and class A is a generalization of class B, then B is simply a subset of A. Each class is drawn as a rectangle labelled with the name of the class. It contains a list of the attributes of the class, separated from the name by a horizontal line, and a list of the operations of the class, separated from the attribute list by a horizontal line. In the class diagrams which follow, however, operations are never modelled. An association is
30 drawn as a line joining two classes, optionally labelled at either end with the multiplicity of the association. The default multiplicity is one. An asterisk (*) indicates a multiplicity

of “many”, i.e. zero or more. Each association is optionally labelled with its name, and is also optionally labelled at either end with the role of the corresponding class. An open diamond indicates an aggregation association (“is-part-of”), and is drawn at the aggregator end of the association line. A generalization relationship (“is-a”) is drawn as a solid line joining two classes, with an arrow (in the form of an open triangle) at the generalization end. When a class diagram is broken up into multiple diagrams, any class which is duplicated is shown with a dashed outline in all but the main diagram which defines it. It is shown with attributes only where it is defined.

Netpages are the foundation on which a netpage network is built. They provide a paper-based user interface to published information and interactive services. A netpage consists of a printed page (or other surface region) invisibly tagged with references to an online description of the page. The online page description is maintained persistently by a netpage page server. The page description describes the visible layout and content of the page, including text, graphics and images. It also describes the input elements on the page, including buttons, hyperlinks, and input fields. A netpage allows markings made with a netpage pen on its surface to be simultaneously captured and processed by the netpage system.

Multiple netpages can share the same page description. However, to allow input through otherwise identical pages to be distinguished, each netpage is assigned a unique page identifier. This page ID has sufficient precision to distinguish between a very large number of netpages.

Each reference to the page description is encoded in a printed tag. The tag identifies the unique page on which it appears, and thereby indirectly identifies the page description. The tag also identifies its own position on the page. Characteristics of the tags are described in more detail below.

Tags are printed in infrared-absorptive ink on any substrate which is infrared-reflective, such as ordinary paper. Near-infrared wavelengths are invisible to the human eye but are easily sensed by a solid-state image sensor with an appropriate filter.

A tag is sensed by an area image sensor in the netpage pen, and the tag data is transmitted to the netpage system via the nearest netpage printer. The pen is wireless and communicates with the netpage printer via a short-range radio link. Tags are sufficiently

small and densely arranged that the pen can reliably image at least one tag even on a single click on the page. It is important that the pen recognize the page ID and position on every interaction with the page, since the interaction is stateless. Tags are error-correctably encoded to make them partially tolerant to surface damage.

- 5 The netpage page server maintains a unique page instance for each printed netpage, allowing it to maintain a distinct set of user-supplied values for input fields in the page description for each printed netpage.

10 The relationship between the page description, the page instance, and the printed netpage is shown in Figure 3. The printed netpage may be part of a printed netpage document 45. The page instance is associated with both the netpage printer which printed it and, if known, the netpage user who requested it.

- 15 In a preferred form, each tag identifies the region in which it appears, and the location of that tag within the region. A tag may also contain flags which relate to the region as a whole or to the tag. One or more flag bits may, for example, signal a tag sensing device to provide feedback indicative of a function associated with the immediate area of the tag, without the sensing device having to refer to a description of the region. A netpage pen may, for example, illuminate an "active area" LED when in the zone of a hyperlink.

- 20 In a preferred embodiment, each tag contains an easily recognized invariant structure which aids initial detection, and which assists in minimizing the effect of any warp induced by the surface or by the sensing process. The tags preferably tile the entire page, and are sufficiently small and densely arranged that the pen can reliably image at least one tag even on a single click on the page. It is important that the pen recognize the page ID and position on every interaction with the page, since the interaction is stateless.

- 25 In a preferred embodiment, the region to which a tag refers coincides with an entire page, and the region ID encoded in the tag is therefore synonymous with the page ID of the page on which the tag appears. In other embodiments, the region to which a tag refers can be an arbitrary subregion of a page or other surface. For example, it can coincide with the zone of an interactive element, in which case the region ID can directly
30 identify the interactive element.

Each tag contains typically contains 16 bits of tag ID, at least 90 bits of region ID, and a number of flag bits. Assuming a maximum tag density of 64 per square inch, a 16-bit tag ID supports a region size of up to 1024 square inches. Larger regions can be mapped continuously without increasing the tag ID precision simply by using abutting regions and maps. The distinction between a region ID and a tag ID is mostly one of convenience. For most purposes the concatenation of the two can be considered as a globally unique tag ID. Conversely, it may also be convenient to introduce structure into the tag ID, for example to define the x and y coordinates of the tag. A 90-bit region ID allows 2^{90} ($\sim 10^{27}$ or a thousand trillion trillion) different regions to be uniquely identified. Tags may also contain type information, and a region may be tagged with a mixture of tag types. For example, a region may be tagged with one set of tags encoding x coordinates and another set, interleaved with the first, encoding y coordinates.

In one embodiment, 120 bits of tag data are redundantly encoded using a (15, 5) Reed-Solomon code. This yields 360 encoded bits consisting of 6 codewords of 15 4-bit symbols each. The (15, 5) code allows up to 5 symbol errors to be corrected per codeword, i.e. it is tolerant of a symbol error rate of up to 33% per codeword. Each 4-bit symbol is represented in a spatially coherent way in the tag, and the symbols of the six codewords are interleaved spatially within the tag. This ensures that a burst error (an error affecting multiple spatially adjacent bits) damages a minimum number of symbols overall and a minimum number of symbols in any one codeword, thus maximising the likelihood that the burst error can be fully corrected.

Any suitable error-correcting code can be used in place of a (15, 5) Reed-Solomon code, for example a Reed-Solomon code with more or less redundancy, with the same or different symbol and codeword sizes; another block code; or a different kind of code, such as a convolutional code (see, for example, Stephen B. Wicker, Error Control Systems for Digital Communication and Storage, Prentice-Hall 1995, the contents of which are herein incorporated by cross-reference).

One embodiment of the physical representation of the tag, shown in Figure 4a and described in our earlier application USSN 09/_____ (docket no. NPT002US), includes fixed target structures 15, 16, 17 and variable data areas 18. The fixed target structures allow a sensing device such as the netpage pen to detect the tag and infer its

three-dimensional orientation relative to the sensor. The data areas contain representations of the individual bits of the encoded tag data. To maximise its size, each data bit is represented by a radial wedge in the form of an area bounded by two radial lines and two concentric circular arcs. Each wedge has a minimum dimension of 8 dots at 1600 dpi and is designed so that its base (its inner arc), is at least equal to this minimum dimension. The height of the wedge in the radial direction is always equal to the minimum dimension. Each 4-bit data symbol is represented by an array of 2x2 wedges. The fifteen 4-bit data symbols of each of the six codewords are allocated to the four concentric symbol rings 18a to 18d in interleaved fashion. Symbols are allocated alternately in circular progression around the tag. The interleaving is designed to maximise the average spatial distance between any two symbols of the same codeword.

In order to support "single-click" interaction with a tagged region via a sensing device, the sensing device must be able to see at least one entire tag in its field of view no matter where in the region or at what orientation it is positioned. The required diameter of the field of view of the sensing device is therefore a function of the size and spacing of the tags. Assuming a circular tag shape, the minimum diameter of the sensor field of view 193 is obtained when the tags are tiled on a equilateral triangular grid, as shown in Figure 4b.

The tag structure just described is designed to allow both regular tilings of planar surfaces and irregular tilings of non-planar surfaces. Regular tilings are not, in general, possible on non-planar surfaces. In the more usual case of planar surfaces where regular tilings of tags are possible, i.e. surfaces such as sheets of paper and the like, more efficient tag structures can be used which exploit the regular nature of the tiling.

An alternative tag structure more suited to a regular tiling is shown in Figure 5a. The tag 4 is square and has four perspective targets 17. It is similar in structure to tags described by Bennett et al. in US Patent 5,051,746. The tag represents sixty 4-bit Reed-Solomon symbols 47, for a total of 240 bits. The tag represents each one bit as a dot 48, and each zero bit by the absence of the corresponding dot. The perspective targets are designed to be shared between adjacent tags, as shown in Figures 5b and 5c. Figure 5b shows a square tiling of 16 tags and the corresponding minimum field of view 193, which must span the diagonals of two tags. Figure 5c shows a square tiling of nine tags,

containing all one bits for illustration purposes.

Using a (15, 7) Reed-Solomon code, 112 bits of tag data are redundantly encoded to produce 240 encoded bits. The four codewords are interleaved spatially within the tag to maximize resilience to burst errors. Assuming a 16-bit tag ID as before, this allows a region ID of up to 92 bits. The data-bearing dots 48 of the tag are designed to not overlap their neighbors, so that groups of tags cannot produce structures which resemble targets. This also saves ink. The perspective targets therefore allow detection of the tag, so further targets are not required.

Although the tag may contain an orientation feature to allow disambiguation of the four possible orientations of the tag relative to the sensor, it is also possible to embed orientation data in the tag data. For example, the four codewords can be arranged so that each tag orientation contains one codeword placed at that orientation, as shown in Figure 5d, where each symbol is labelled with the number of its codeword (1-4) and the position of the symbol within the codeword (A-O). Tag decoding then consists of decoding one codeword at each orientation. Each codeword can either contain a single bit indicating whether it is the first codeword, or two bits indicating which codeword it is. The latter approach has the advantage that if, say, the data content of only one codeword is required, then at most two codewords need to be decoded to obtain the desired data. This may be the case if the region ID is not expected to change within a stroke and is thus only decoded at the start of a stroke. Within a stroke only the codeword containing the tag ID is then desired. Furthermore, since the rotation of the sensing device changes slowly and predictably within a stroke, only one codeword typically needs to be decoded per frame.

It is possible to dispense with perspective targets altogether and instead rely on the data representation being self-registering. In this case each bit value (or multi-bit value) is typically represented by an explicit glyph, i.e. no bit value is represented by the absence of a glyph. This ensures that the data grid is well-populated, and thus allows the grid to be reliably identified and its perspective distortion detected and subsequently corrected during data sampling. To allow tag boundaries to be detected, each tag data must contain a marker pattern, and these must be redundantly encoded to allow reliable detection. The overhead of such marker patterns is similar to the overhead of explicit

perspective targets. One such scheme uses dots positioned at various points relative to grid vertices to represent different glyphs and hence different multi-bit values (see Anoto Technology Description, Anoto April 2000).

Decoding a tag results in a region ID, a tag ID, and a tag-relative pen transform.

- 5 Before the tag ID and the tag-relative pen location can be translated into an absolute location within the tagged region, the location of the tag within the region must be known. This is given by a tag map, a function which maps each tag ID in a tagged region to a corresponding location. A tag map reflects the scheme used to tile the surface region with tags, and this can vary according to surface type. When multiple tagged regions
- 10 share the same tiling scheme and the same tag numbering scheme, they can also share the same tag map. The tag map for a region must be retrievable via the region ID. Thus, given a region ID, a tag ID and a pen transform, the tag map can be retrieved, the tag ID can be translated into an absolute tag location within the region, and the tag-relative pen location can be added to the tag location to yield an absolute pen location within the
- 15 region.

- The tag ID may have a structure which assists translation through the tag map. It may, for example, encoded cartesian coordinates or polar coordinates, depending on the surface type on which it appears. The tag ID structure is dictated by and known to the tag map, and tag IDs associated with different tag maps may therefore have different
- 20 structures.

Two distinct surface coding schemes are of interest, both of which use the tag structure described earlier in this section. The preferred coding scheme uses “location-indicating” tags as already discussed. An alternative coding scheme uses “object-indicating” (or “function-indicating”) tags.

- 25 A location-indicating tag contains a tag ID which, when translated through the tag map associated with the tagged region, yields a unique tag location within the region. The tag-relative location of the pen is added to this tag location to yield the location of the pen within the region. This in turn is used to determine the location of the pen relative to a user interface element in the page description associated with the region.
- 30 Not only is the user interface element itself identified, but a location relative to the user interface element is identified. Location-indicating tags therefore trivially support the

capture of an absolute pen path in the zone of a particular user interface element.

An object-indicating (or function-indicating) tag contains a tag ID which directly identifies a user interface element in the page description associated with the region (or equivalently, a function). All the tags in the zone of the user interface element identify the user interface element, making them all identical and therefore indistinguishable. Object-indicating tags do not, therefore, support the capture of an absolute pen path. They do, however, support the capture of a relative pen path. So long as the position sampling frequency exceeds twice the encountered tag frequency, the displacement from one sampled pen position to the next within a stroke can be unambiguously determined. As an alternative, the netpage pen 101 can contain a pair or motion-sensing accelerometers, as described in our earlier application USSN 09/_____ (docket no. NPS001US).

With either tagging scheme, the tags function in cooperation with associated visual elements on the netpage as user interactive elements in that a user can interact with the printed page using an appropriate sensing device in order for tag data to be read by the sensing device and for an appropriate response to be generated in the netpage system.

PERSONALIZED PUBLICATION MODEL

In the following description, news is used as a canonical publication example to illustrate personalization mechanisms in the netpage system. Although news is often used in the limited sense of newspaper and newsmagazine news, the intended scope in the present context is wider.

In the netpage system, the editorial content and the advertising content of a news publication are personalized using different mechanisms. The editorial content is personalized according to the reader's explicitly stated and implicitly captured interest profile. The advertising content is personalized according to the reader's locality and demographic.

EDITORIAL PERSONALIZATION

A subscriber can draw on two kinds of news sources: those that deliver news publications, and those that deliver news streams. While news publications are

aggregated and edited by the publisher, news streams are aggregated either by a news publisher or by a specialized news aggregator. News publications typically correspond to traditional newspapers and newsmagazines, while news streams can be many and varied: a “raw” news feed from a news service, a cartoon strip, a freelance writer’s column, a friend’s bulletin board, or the reader’s own e-mail.

The netpage publication server supports the publication of edited news publications as well as the aggregation of multiple news streams. By handling the aggregation and hence the formatting of news streams selected directly by the reader, the server is able to place advertising on pages over which it otherwise has no editorial control.

The subscriber builds a daily newspaper by selecting one or more contributing news publications, and creating a personalized version of each. The resulting daily editions are printed and bound together into a single newspaper. The various members of a household typically express their different interests and tastes by selecting different daily publications and then customizing them.

For each publication, the reader optionally selects specific sections. Some sections appear daily, while others appear weekly. The daily sections available from The New York Times online, for example, include “Page One Plus”, “National”, “International”, “Opinion”, “Business”, “Arts/Living”, “Technology”, and “Sports”. The set of available sections is specific to a publication, as is the default subset.

The reader can extend the daily newspaper by creating custom sections, each one drawing on any number of news streams. Custom sections might be created for e-mail and friends’ announcements (“Personal”), or for monitoring news feeds for specific topics (“Alerts” or “Clippings”).

For each section, the reader optionally specifies its size, either qualitatively (e.g. short, medium, or long), or numerically (i.e. as a limit on its number of pages), and the desired proportion of advertising, either qualitatively (e.g. high, normal, low, none), or numerically (i.e. as a percentage).

The reader also optionally expresses a preference for a large number of shorter articles or a small number of longer articles. Each article is ideally written (or edited) in

both short and long forms to support this preference.

An article may also be written (or edited) in different versions to match the expected sophistication of the reader, for example to provide children's and adults' versions. The appropriate version is selected according to the reader's age. The reader
5 can specify a "reading age" which takes precedence over their biological age.

The articles which make up each section are selected and prioritized by the editors, and each is assigned a useful lifetime. By default they are delivered to all relevant subscribers, in priority order, subject to space constraints in the subscribers' editions.

10 In sections where it is appropriate, the reader may optionally enable collaborative filtering. This is then applied to articles which have a sufficiently long lifetime. Each article which qualifies for collaborative filtering is printed with rating buttons at the end of the article. The buttons can provide an easy choice (e.g. "liked" and "disliked"), making it more likely that readers will bother to rate the article.

15 Articles with high priorities and short lifetimes are therefore effectively considered essential reading by the editors and are delivered to most relevant subscribers.

The reader optionally specifies a serendipity factor, either qualitatively (e.g. do or don't surprise me), or numerically. A high serendipity factor lowers the threshold used
20 for matching during collaborative filtering. A high factor makes it more likely that the corresponding section will be filled to the reader's specified capacity. A different serendipity factor can be specified for different days of the week.

The reader also optionally specifies topics of particular interest within a section, and this modifies the priorities assigned by the editors.

25 The speed of the reader's Internet connection affects the quality at which images can be delivered. The reader optionally specifies a preference for fewer images or smaller images or both. If the number or size of images is not reduced, then images may be delivered at lower quality (i.e. at lower resolution or with greater compression).

At a global level, the reader specifies how quantities, dates, times and monetary
30 values are localized. This involves specifying whether units are imperial or metric, a

local timezone and time format, and a local currency, and whether the localization consist of in situ translation or annotation. These preferences are derived from the reader's locality by default.

To reduce reading difficulties caused by poor eyesight, the reader optionally
5 specifies a global preference for a larger presentation. Both text and images are scaled accordingly, and less information is accommodated on each page.

The language in which a news publication is published, and its corresponding text encoding, is a property of the publication and not a preference expressed by the user. However, the netpage system can be configured to provide automatic translation services
10 in various guises.

ADVERTISING LOCALIZATION AND TARGETING

The personalization of the editorial content directly affects the advertising content, because advertising is typically placed to exploit the editorial context. Travel ads, for example, are more likely to appear in a travel section than elsewhere. The value
15 of the editorial content to an advertiser (and therefore to the publisher) lies in its ability to attract large numbers of readers with the right demographics.

Effective advertising is placed on the basis of locality and demographics. Locality determines proximity to particular services, retailers etc., and particular interests and concerns associated with the local community and environment. Demographics
20 determine general interests and preoccupations as well as likely spending patterns.

A news publisher's most profitable product is advertising "space", a multi-dimensional entity determined by the publication's geographic coverage, the size of its readership, its readership demographics, and the page area available for advertising.

In the netpage system, the netpage publication server computes the
25 approximate multi-dimensional size of a publication's saleable advertising space on a per-section basis, taking into account the publication's geographic coverage, the section's readership, the size of each reader's section edition, each reader's advertising proportion, and each reader's demographic.

In comparison with other media, the netpage system allows the advertising
30 space to be defined in greater detail, and allows smaller pieces of it to be sold separately.

It therefore allows it to be sold at closer to its true value.

For example, the same advertising “slot” can be sold in varying proportions to several advertisers, with individual readers’ pages randomly receiving the advertisement of one advertiser or another, overall preserving the proportion of space sold to each advertiser.

The netpage system allows advertising to be linked directly to detailed product information and online purchasing. It therefore raises the intrinsic value of the advertising space.

Because personalization and localization are handled automatically by netpage publication servers, an advertising aggregator can provide arbitrarily broad coverage of both geography and demographics. The subsequent disaggregation is efficient because it is automatic. This makes it more cost-effective for publishers to deal with advertising aggregators than to directly capture advertising. Even though the advertising aggregator is taking a proportion of advertising revenue, publishers may find the change profit-neutral because of the greater efficiency of aggregation. The advertising aggregator acts as an intermediary between advertisers and publishers, and may place the same advertisement in multiple publications.

It is worth noting that ad placement in a netpage publication can be more complex than ad placement in the publication’s traditional counterpart, because the publication’s advertising space is more complex. While ignoring the full complexities of negotiations between advertisers, advertising aggregators and publishers, the preferred form of the netpage system provides some automated support for these negotiations, including support for automated auctions of advertising space. Automation is particularly desirable for the placement of advertisements which generate small amounts of income, such as small or highly localized advertisements.

Once placement has been negotiated, the aggregator captures and edits the advertisement and records it on a netpage ad server. Correspondingly, the publisher records the ad placement on the relevant netpage publication server. When the netpage publication server lays out each user’s personalized publication, it picks the relevant advertisements from the netpage ad server.

INTERSTITIAL ADVERTISING

The netpage system provides a mechanism whereby advertising can be placed automatically in otherwise empty space in a document. A typical netpage interaction sequence is likely to print many single pages where the reverse side of the page is empty.

- 5 Advertising can be placed in space within a document, particularly the reverse side of a netpage sheet where the reverse side is otherwise empty. The advertising is non-intrusive, and although it may not be seen immediately, it persists on the page and may be seen later.

- 10 With reference to Figure 6, a document page 500 may have page content 501 at the top of the page and empty space at the bottom of the page. Figure 6 illustrates an example of the placement of an advertisement 502 in empty space on the same page of the document.

- 15 With reference to Figure 7, a document page 503 may have page content 504 filling the front page, and may be blank on the reverse side 505 of the page. Figure 7 illustrates an example of the placement of an advertisement 506 on the otherwise empty reverse side of a document.

The advertising can be placed in personalized publications, or any netpage document, as long as there is space available. However, as usual, this advertising is the most effective when targeted to the user, i.e. demographically based.

- 20 Ownership of this “interstitial” advertising space can lie with the application provider that provides the document content, or with the infrastructure provider involved in document delivery, such as the printer provider. In any case the advertising can be chosen in various ways to relate to the content of the page or document.

CONCLUSION

- 25 The present invention has been described with reference to a preferred embodiment and number of specific alternative embodiments. However, it will be appreciated by those skilled in the relevant fields that a number of other embodiments, differing from those specifically described, will also fall within the spirit and scope of the present invention. Accordingly, it will be understood that the invention is not
30 intended to be limited to the specific embodiments described in the present specification,

including documents incorporated by cross-reference as appropriate. The scope of the invention is only limited by the attached claims.

CLAIMS

1. A method of producing a document by formatting user requested information in the document so as to include one user interactive element, to allow the user to effect a
5 response to the information, using a sensing device for transmitting response data back to a computer system, including:

identifying an advertising space, outside an area of the document to be occupied by the information; and

printing the document with advertising material in the space.

10

2. A method as claimed in claim 1, wherein the advertising space is determined to be on a reverse side of the document relative to the user requested information.

3. A method as claimed in claim 1 or 2 wherein the information is formatted at a
15 publication server of the computer system and the method includes the publication server monitoring the said area and, once the space is identified, receiving the advertising material from an advertising server, for inclusion in the document.

4. A method as claimed in claim 1, wherein the document is printed with coded data, for
20 sensing by the sensing device, indicative of an identity of the document and of the at least one interactive element.

5. A method as claimed in claim 4, wherein the document is printed on a surface defining structure at the same time as the coded data is printed on the surfaces.

25

6. A method as claimed in claim 5, which includes printing the coded data to be substantially invisible in the visible spectrum.

7. A method as claimed in claim 4, including retaining a retrievable record of the printed document, the document being retrievable using the identity data as contained in the coded data.

- 5 8. A method as claimed in claim 1, wherein the sensing device includes an identification code specific to a particular user and the method includes monitoring use of the sensing device in the computer system.

9. A system for producing a document, including :

- 10 a computer system for formatting user requested information in the document so as to include at least one user interactive element, to allow the user to effect a response to the information, using a sensing device for transmitting response data back to the computer system, wherein the computer system is arranged to identify an advertising space, outside an area of the document to be occupied by the information and
15 to effect printing of the document with advertising material in said space.

10. A system as claimed in claim 9, further including a printer adapted to print on both sides of the document, in order to print the advertising material on a reverse side of the document, relative to the user requested information.

20

11. A system as claimed in claim 9, wherein the computer system includes a publication server for formatting the document and an advertising server for providing the advertising material, wherein the publication server monitors said area and receives advertising material from the advertising server, for inclusion in the document.

25

12. A system as claimed in claim 9, wherein the document includes coded data indicative of an identity of the document and of the at least one interactive element.

13. A system as claimed in claim 12, wherein the printer is arranged to print the coded data at the same time as printing the document on a surface defining structure.

14. A system as claimed in claim 12, wherein the coded data is substantially
5 invisible in the visible spectrum.

15. A system as claimed in claim 12, including a database for keeping a retrievable record of each document generated, each document being retrievable by using its identity, as included in the coded data.

10

Variable	Mean	SD	Min	Max
Age	38.5	12.5	18	65
Gender	50%	50%	Male	Female
Marital status	75%	25%	Married	Single
Education	12.5	2.5	9	16
Income	3500	1500	1000	8000
Occupation	45%	55%	Professional	Non-professional
Health status	85%	15%	Good	Poor
Smoking status	30%	70%	Smoker	Non-smoker
Alcohol consumption	15%	85%	Drinker	Non-drinker
Exercise frequency	2.5	1.5	0	5
Dietary habits	65%	35%	Healthy	Unhealthy
Stress level	4.5	1.5	1	7
Sleep quality	3.5	1.5	1	5
Mental health	5.5	1.5	1	9
Life satisfaction	6.5	1.5	1	9
Overall well-being	7.5	1.5	1	9

Variable	Mean	SD	Min	Max
Age	34.5	10.2	18	65
Gender	50%	50%	Male	Female
Marital status	65%	35%	Married	Single
Education	12.5	1.5	9	16
Income	3500	1500	1000	8000
Occupation	45%	55%	Professional	Non-professional
Health status	75%	25%	Good	Poor
Smoking status	30%	70%	Smoker	Non-smoker
Alcohol consumption	15%	85%	Drinker	Non-drinker
Exercise frequency	20%	80%	Regular	Irregular
Stress level	60%	40%	Low	High
Sleep quality	70%	30%	Good	Poor
Dietary habits	55%	45%	Healthy	Unhealthy
Family size	3.5	1.5	1	6
Religious beliefs	60%	40%	Religious	Secular
Community involvement	40%	60%	Active	Passive
Life satisfaction	70%	30%	High	Low
Work-life balance	50%	50%	Good	Poor
Financial stability	65%	35%	Stable	Unstable
Healthcare access	80%	20%	Good	Poor
Environmental quality	55%	45%	Good	Poor
Transportation	60%	40%	Good	Poor
Public services	65%	35%	Good	Poor
Crime rate	40%	60%	Low	High
Police presence	50%	50%	Good	Poor
Community safety	60%	40%	Good	Poor
Local economy	55%	45%	Good	Poor
Unemployment rate	10%	5%	Low	High
Local government	60%	40%	Good	Poor
Infrastructure	65%	35%	Good	Poor
Public transport	50%	50%	Good	Poor
Local culture	60%	40%	Good	Poor
Local history	65%	35%	Good	Poor
Local landmarks	70%	30%	Good	Poor
Local festivals	75%	25%	Good	Poor
Local cuisine	80%	20%	Good	Poor
Local shopping	85%	15%	Good	Poor
Local entertainment	90%	10%	Good	Poor
Local education	95%	5%	Good	Poor
Local healthcare	98%	2%	Good	Poor
Local environment	99%	1%	Good	Poor
Local infrastructure	99%	1%	Good	Poor
Local public services	99%	1%	Good	Poor
Local crime rate	99%	1%	Low	High
Local police presence	99%	1%	Good	Poor
Local community safety	99%	1%	Good	Poor
Local economy	99%	1%	Good	Poor
Local unemployment rate	99%	1%	Low	High
Local government	99%	1%	Good	Poor
Local infrastructure	99%	1%	Good	Poor
Local public transport	99%	1%	Good	Poor
Local culture	99%	1%	Good	Poor
Local history	99%	1%	Good	Poor
Local landmarks	99%	1%	Good	Poor
Local festivals	99%	1%	Good	Poor
Local cuisine	99%	1%	Good	Poor
Local shopping	99%	1%	Good	Poor
Local entertainment	99%	1%	Good	Poor
Local education	99%	1%	Good	Poor
Local healthcare	99%	1%	Good	Poor
Local environment	99%	1%	Good	Poor
Local infrastructure	99%	1%	Good	Poor
Local public services	99%	1%	Good	Poor
Local crime rate	99%	1%	Low	High
Local police presence	99%	1%	Good	Poor
Local community safety	99%	1%	Good	Poor
Local economy	99%	1%	Good	Poor
Local unemployment rate	99%	1%	Low	High
Local government	99%	1%	Good	Poor
Local infrastructure	99%	1%	Good	Poor
Local public transport	99%	1%	Good	Poor
Local culture	99%	1%	Good	Poor
Local history	99%	1%	Good	Poor
Local landmarks	99%	1%	Good	Poor
Local festivals	99%	1%	Good	Poor
Local cuisine	99%	1%	Good	Poor
Local shopping	99%	1%	Good	Poor
Local entertainment	99%	1%	Good	Poor
Local education	99%	1%	Good	Poor
Local healthcare	99%	1%	Good	Poor
Local environment	99%	1%	Good	Poor
Local infrastructure	99%	1%	Good	Poor
Local public services	99%	1%	Good	Poor
Local crime rate	99%	1%	Low	High
Local police presence	99%	1%	Good	Poor
Local community safety	99%	1%	Good	Poor
Local economy	99%	1%	Good	Poor
Local unemployment rate	99%	1%	Low	High
Local government	99%	1%	Good	Poor
Local infrastructure	99%	1%		

Variable	Mean	SD	Min	Max
Age	38.5	12.5	18	65
Gender	50%	50%	Male	Female
Marital status	75%	25%	Married	Single
Education	12.5	1.5	9	16
Income	3500	1500	1000	8000
Occupation	45%	55%	Professional	Non-professional
Health status	85%	15%	Good	Poor
Smoking status	30%	70%	Smoker	Non-smoker
Alcohol consumption	15%	85%	Drinker	Non-drinker
Exercise frequency	20%	80%	Regular	Irregular
Stress level	65%	35%	Low	High
Sleep quality	70%	30%	Good	Poor
Dietary habits	60%	40%	Healthy	Unhealthy
Family size	3.5	1.5	1	6
Religious beliefs	75%	25%	Religious	Secular
Community involvement	40%	60%	Active	Passive
Life satisfaction	70%	30%	Satisfied	Dissatisfied
Work-life balance	60%	40%	Good	Poor
Financial stability	75%	25%	Stable	Unstable
Healthcare access	85%	15%	Good	Poor
Environmental quality	65%	35%	Good	Poor
Transportation	70%	30%	Good	Poor
Public services	75%	25%	Good	Poor
Crime rate	60%	40%	Low	High
Police presence	70%	30%	Good	Poor
Community safety	75%	25%	Good	Poor
Neighborhood cohesion	65%	35%	Good	Poor
Local government	70%	30%	Good	Poor
Infrastructure	75%	25%	Good	Poor
Public spaces	60%	40%	Good	Poor
Green spaces	70%	30%	Good	Poor
Parks and recreation	75%	25%	Good	Poor
Cultural activities	65%	35%	Good	Poor
Arts and culture	70%	30%	Good	Poor
Historical sites	75%	25%	Good	Poor
Heritage preservation	60%	40%	Good	Poor
Urban planning	70%	30%	Good	Poor
City development	75%	25%	Good	Poor
Smart city initiatives	65%	35%	Good	Poor
Digital infrastructure	70%	30%	Good	Poor
Internet access	75%	25%	Good	Poor
Mobile phone usage	85%	15%	Good	Poor
Social media usage	70%	30%	Good	Poor
Online services	75%	25%	Good	Poor
E-commerce	60%	40%	Good	Poor
Digital literacy	70%	30%	Good	Poor
Information security	75%	25%	Good	Poor
Privacy concerns	65%	35%	Good	Poor
Data protection	70%	30%	Good	Poor
Government transparency	75%	25%	Good	Poor
Public participation	60%	40%	Good	Poor
Accountability	70%	30%	Good	Poor
Corruption levels	75%	25%	Good	Poor
Political stability	85%	15%	Good	Poor
Democracy	70%	30%	Good	Poor
Human rights	75%	25%	Good	Poor
Gender equality	65%	35%	Good	Poor
Minority rights	70%	30%	Good	Poor
Religious freedom	75%	25%	Good	Poor
Press freedom	60%	40%	Good	Poor
Academic freedom	70%	30%	Good	Poor
Freedom of expression	75%	25%	Good	Poor
Freedom of movement	85%	15%	Good	Poor
Freedom of assembly	70%	30%	Good	Poor
Freedom of association	75%	25%	Good	Poor
Freedom of religion	85%	15%	Good	Poor
Freedom of speech	70%	30%	Good	Poor
Freedom of the press	75%	25%	Good	Poor
Freedom of the market	85%	15%	Good	Poor
Freedom of trade	70%	30%	Good	Poor
Freedom of investment	75%	25%	Good	Poor
Freedom of labor	85%	15%	Good	Poor
Freedom of choice	70%	30%	Good	Poor
Freedom of movement	75%	25%	Good	Poor
Freedom of assembly	85%	15%	Good	Poor
Freedom of association	70%	30%	Good	Poor
Freedom of religion	75%	25%	Good	Poor
Freedom of speech	85%	15%	Good	Poor
Freedom of the press	70%	30%	Good	Poor
Freedom of the market	75%	25%	Good	Poor
Freedom of trade	85%	15%	Good	Poor
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Freedom of labor	75%	25%	Good	Poor
Freedom of choice	85%	15%	Good	Poor
Freedom of movement	70%	30%	Good	Poor
Freedom of assembly	75%	25%	Good	Poor
Freedom of association	85%	15%	Good	Poor
Freedom of religion	70%	30%	Good	Poor

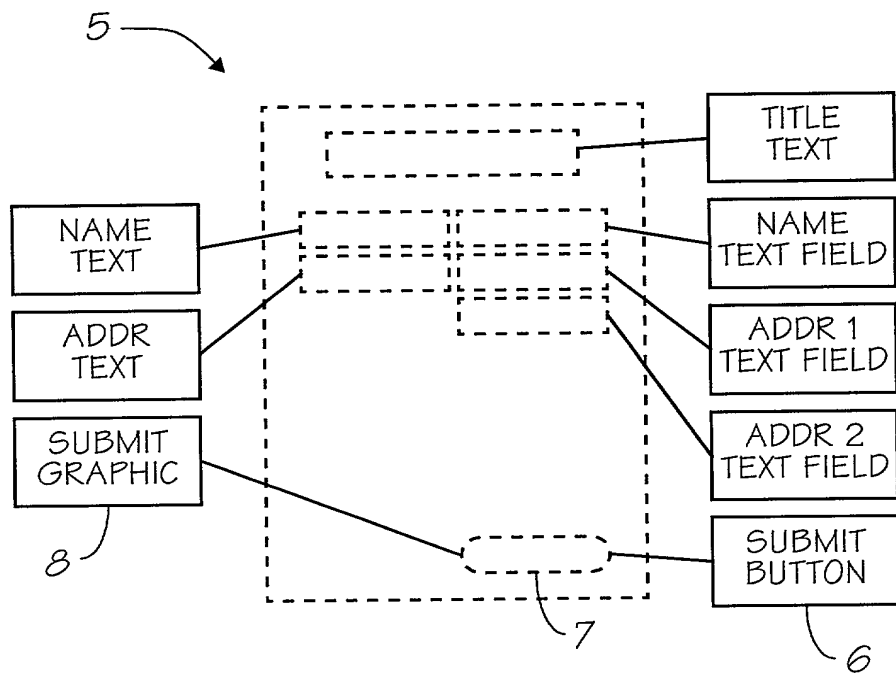
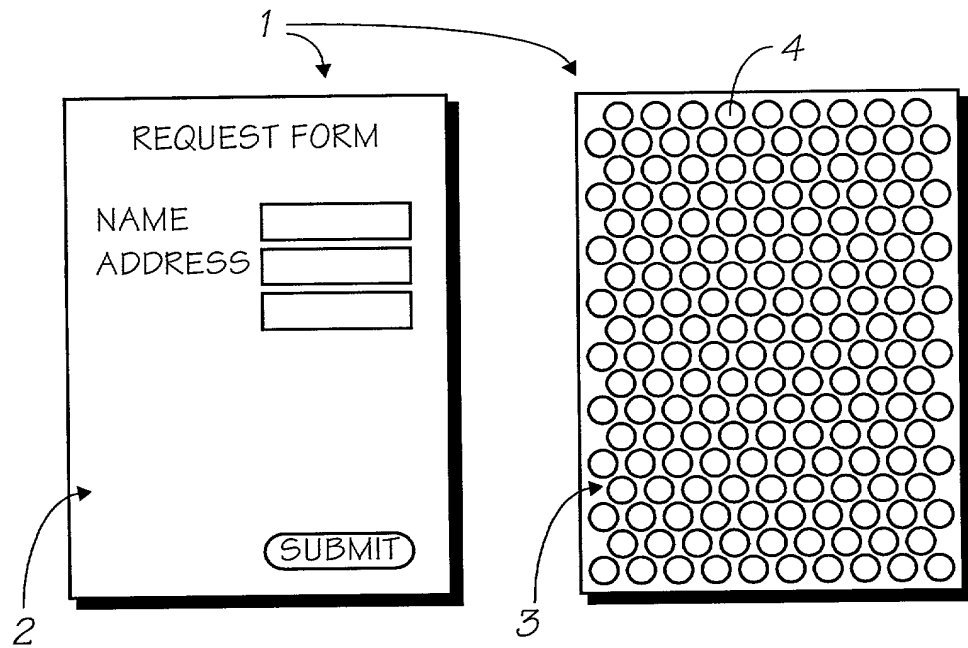


FIG. 1

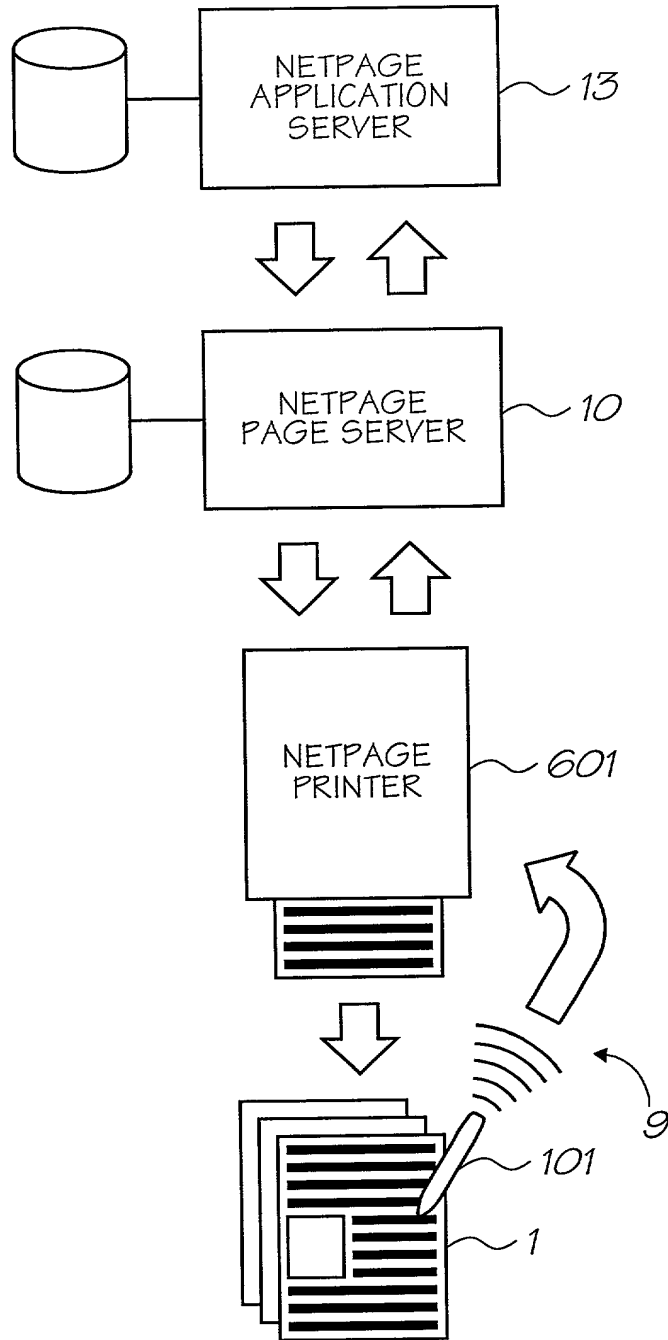


FIG. 2

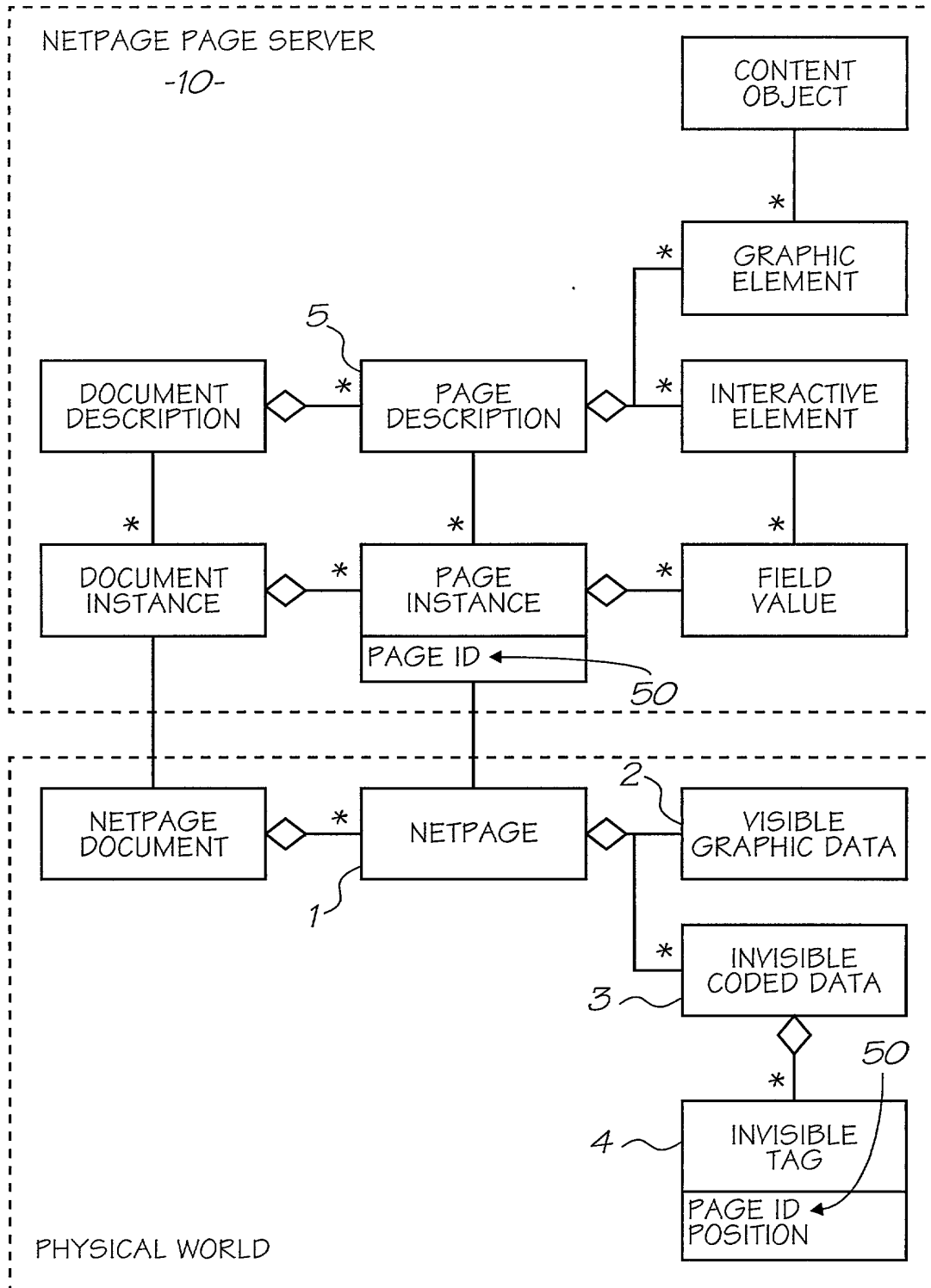


FIG. 3

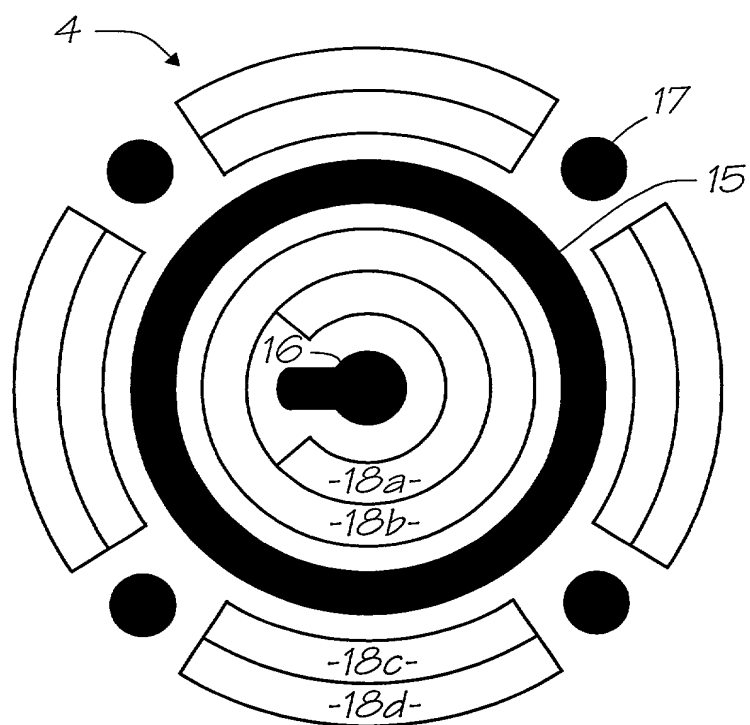


FIG. 4a

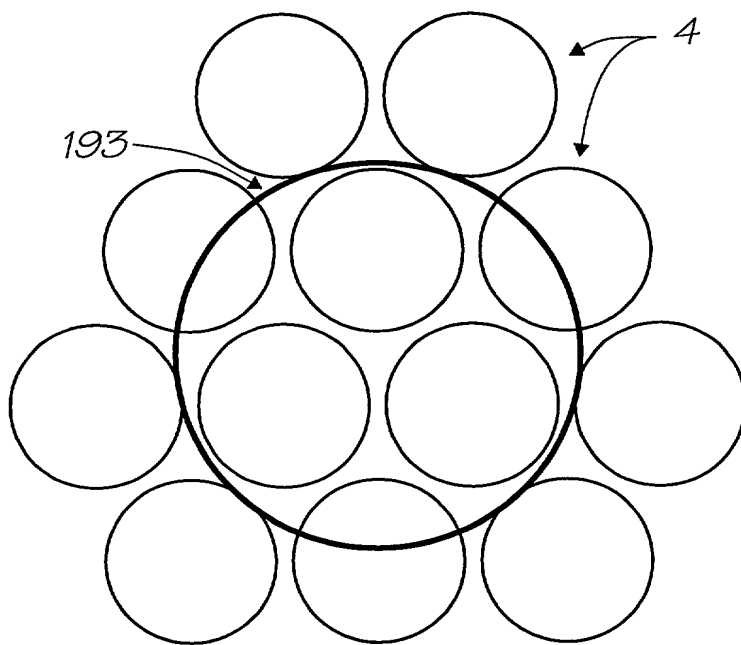


FIG. 4b

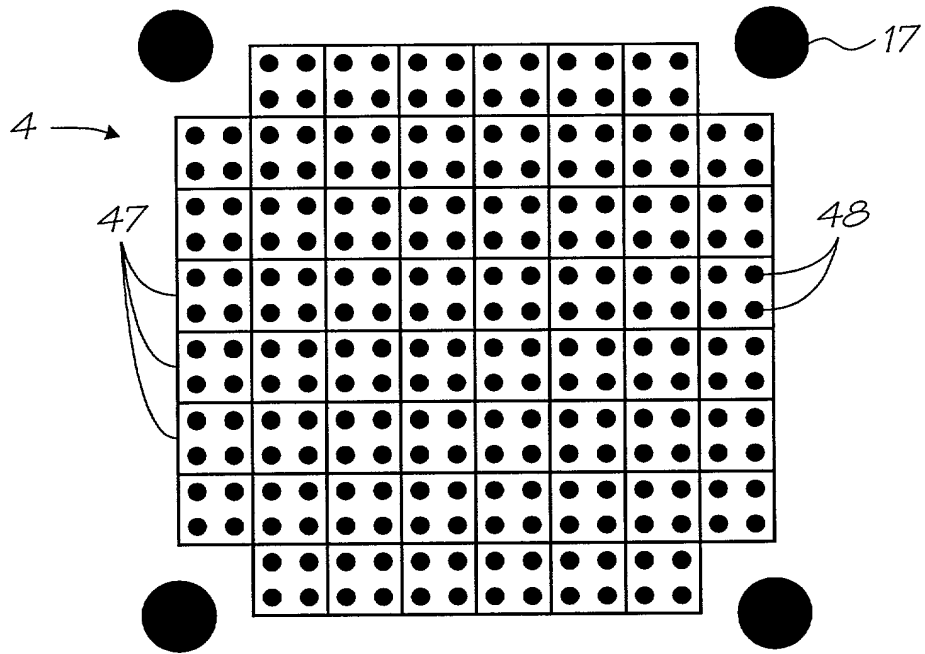


FIG. 5a

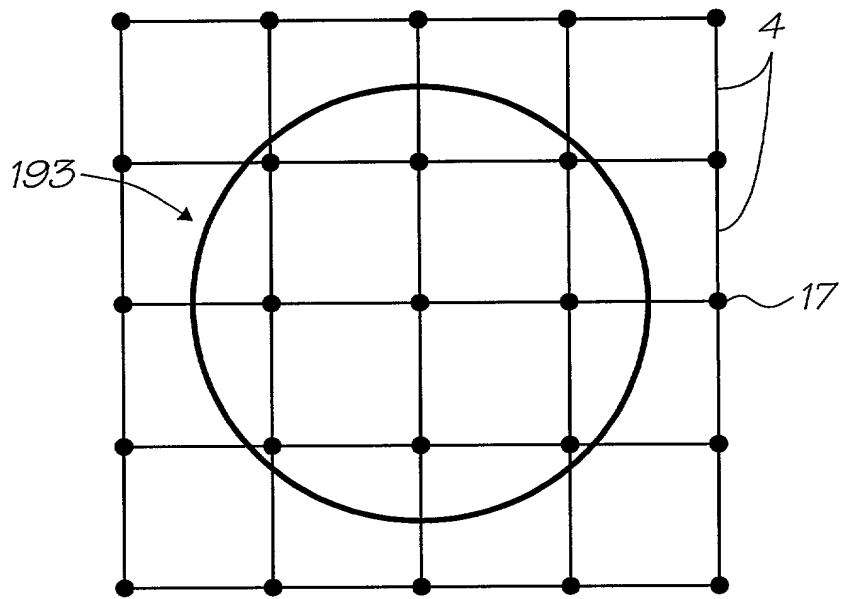


FIG. 5b

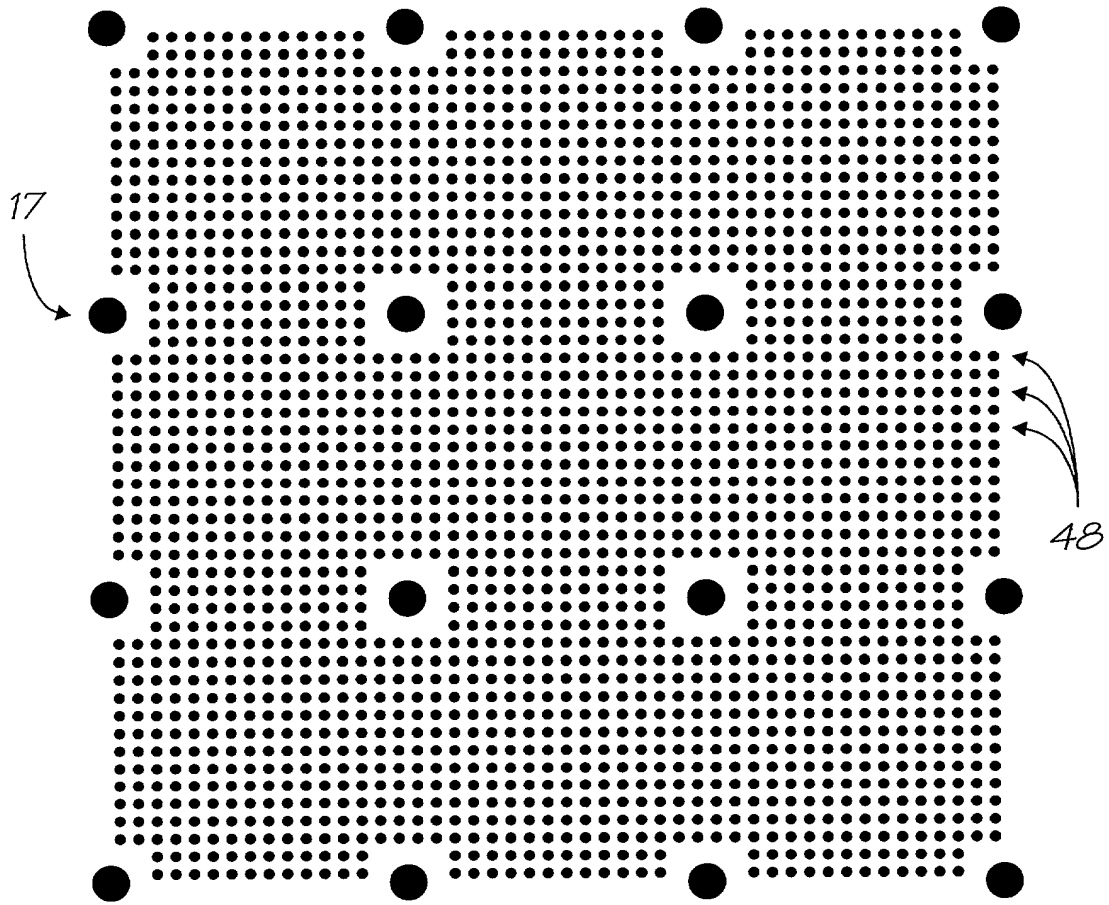


FIG. 5c

47

	1A	4G	1B	4F	1C	4D	
0E	2L	NZ	2H	WZ	2D	1Z	2A
4C	1D	4F	1E	4J	1F	4N	1G
3E	2M	3J	2I	3I	2E	HZ	2B
4B	1H	4E	1I	4J	1J	4M	1K
3G	2N	3F	2J	3E	2F	3D	2C
4A	1L	4D	1M	4F	1N	4I	1O
	2O	3C	2K	3B	2G	3A	

FIG. 5d

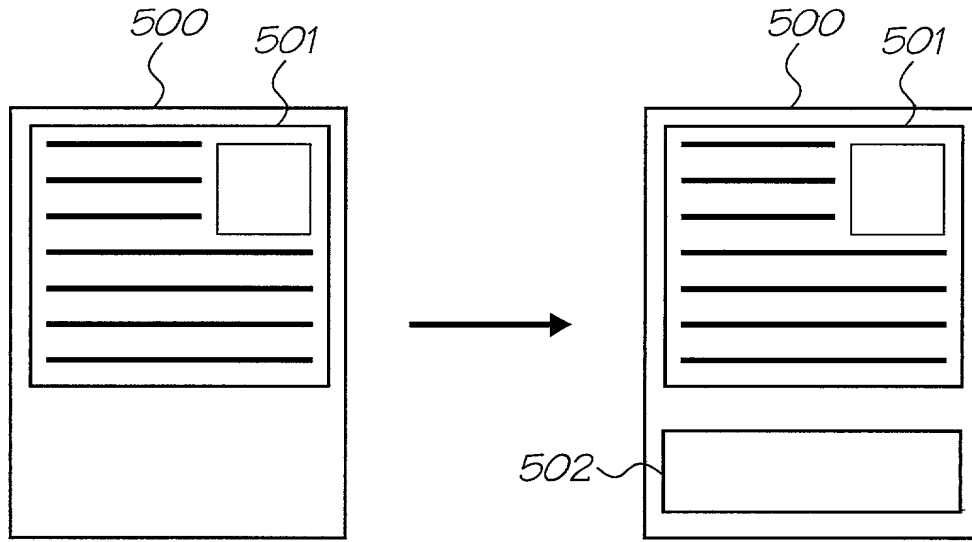


FIG. 6

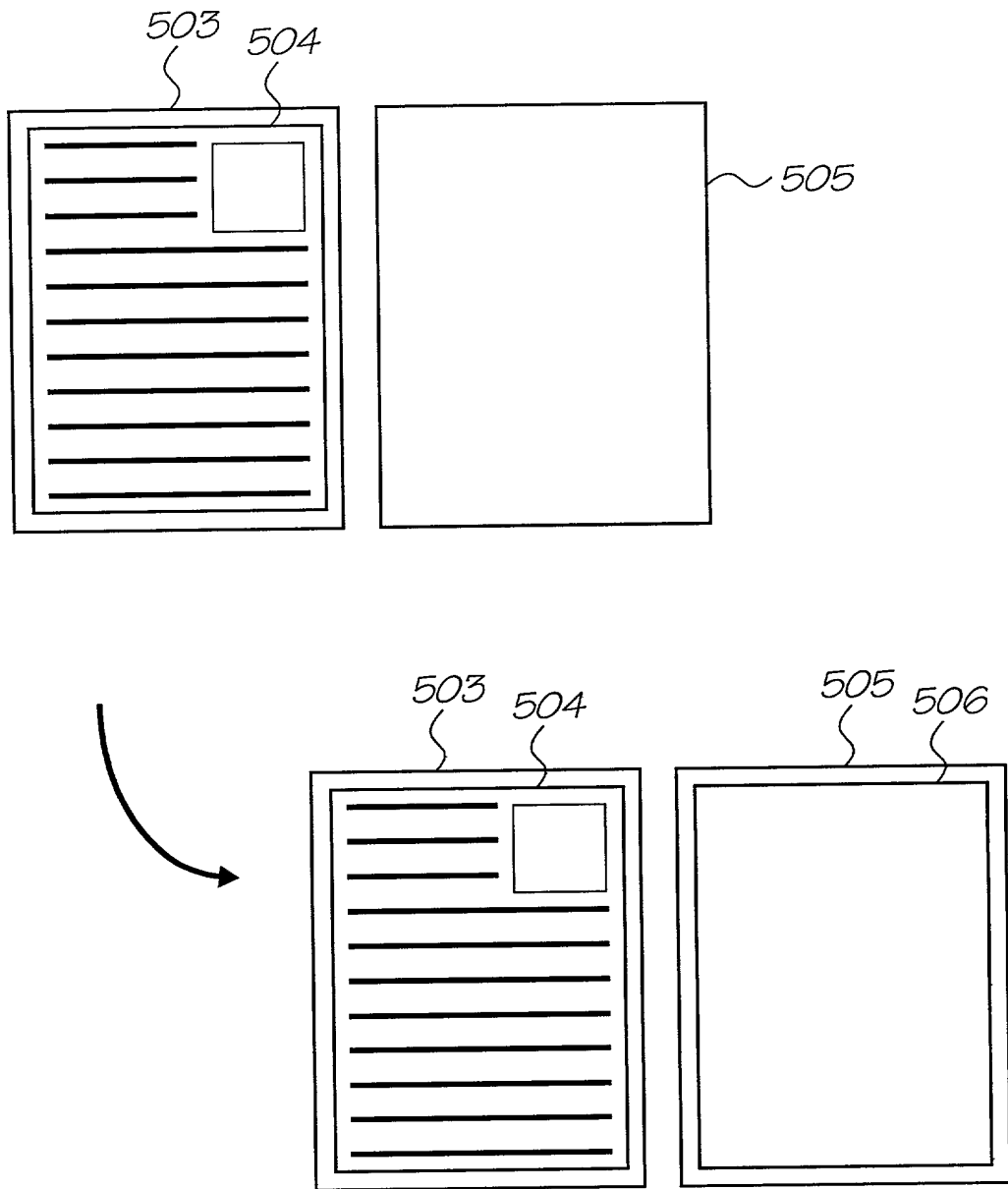


FIG. 7

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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)	Attorney Docket Number	<i>NPA011US</i>
	First Named Inventor	<i>KIA SILVERBROOK</i>
	COMPLETE IF KNOWN	
	Application Number	/
	Filing Date	
	Group Art Unit	
<input checked="" type="checkbox"/> Declaration Submitted with Initial Filing	OR	<input type="checkbox"/> Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)
	Examiner Name	

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

METHOD AND SYSTEM FOR ADVERTISING

the specification of which (Title of the Invention)

☒ is attached hereto
OR
☐ was filed on (MM/DD/YYYY) as United States Application Number or PCT International Application Number and was amended on (MM/DD/YYYY) (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
<i>PQ3632</i>	<i>Australia</i>	<i>10-25-2000</i>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)

☐ Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

[Page 1 of 2]

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DECLARATION — Utility or Design Patent Application

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application or PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number (if applicable)

☐ Additional U.S. or PCT international application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

☐ Customer Number

OR

☐ Registered practitioner(s) name/registration number listed below

 Place Customer
Number Bar Code
Label here

Name	Registration Number	Name	Registration Number

☐ Additional registered practitioner(s) named on supplemental Registered Practitioner Information sheet PTO/SB/02C attached hereto.

Direct all correspondence to: ☒ Customer Number **24011** OR ☒ Correspondence address below

Name	<i>Kia Silverbrook</i>				
Address	<i>Silverbrook Research Pty Ltd</i>				
Address	<i>393 Darling Street</i>				
City	<i>Balmain</i>	State	<i>NSW</i>	ZIP	<i>2041</i>
Country	<i>Australia</i>	Telephone	<i>61-2-9818-6633</i>		Fax <i>61-2-9818-6711</i>

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor:
☐ A petition has been filed for this unsigned inventor

Given Name (first and middle (if any))		Family Name or Surname	
<i>KIA</i>		<i>SILVERBROOK</i>	
Inventor's Signature	<i>[Signature]</i>		Date <i>Oct. 18, 2000</i>
Residence: City	<i>Balmain</i>	State	<i>NSW</i>
		Country	<i>Australia</i>
Post Office Address	<i>393 Darling Street</i>		
Post Office Address			
City	<i>Balmain</i>	State	<i>NSW</i>
		ZIP	<i>2041</i>
		Country	<i>Australia</i>

☒ Additional inventors are being named on the 1 supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto

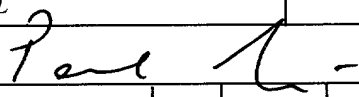
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DECLARATION

ADDITIONAL INVENTOR(S)
 Supplemental Sheet
 Page 1 of 1

Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor					
Given Name (first and middle [if any])				Family Name or Surname			
PAUL				LAPSTUN			
Inventor's Signature						Date	Oct. 18, 2000
Residence: City	Rodd Point	State	NSW	Country	Australia	Citizenship	Norwegian
Post Office Address	13 Duke Avenue						
Post Office Address							
City	Rodd Point	State	NSW	ZIP	2046	Country	Australia
Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor					
Given Name (first and middle [if any])				Family Name or Surname			
Inventor's Signature						Date	
Residence: City		State		Country		Citizenship	
Post Office Address							
Post Office Address							
City		State		ZIP		Country	
Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor					
Given Name (first and middle [if any])				Family Name or Surname			
Inventor's Signature						Date	
Residence: City		State		Country		Citizenship	
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